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TECHNICAL DIVISION  
Operations Area

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CLASSIFICATION CANCELLED  
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ADD signature Date 1/12/85  
Single rereview of CCRP-declassified documents was authorized by DOE Office of Declassification memo of August 22, 1994.

DISTRIBUTION OF I<sup>131</sup> IN WASTES FROM THE Ba<sup>140</sup> PROCESS

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Problem Assignment TX1-1

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July 8, 1946

Experimental work done by the entire operating staff of the Technical Division Operations Area. Analytical work done by Group C of TDSI.

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**DECLASSIFIED**

Per Letter Instructions Of

TID-1160

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For: N. T. Bray, Supervisor  
Laboratory Records Dept,  
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Publicly Releasable

This document has received the necessary patent and technical information reviews and can be distributed without limitation.

~~SECRET~~DISTRIBUTION OF  $I^{131}$  IN WASTES FROM THE $Ba^{140}$  PROCESSIntroduction

Since there has been considerable interest evidenced in  $I^{131}$  a study was made on  $Ba^{140}$  Production Run #10 to determine the distribution of this isotope in the wastes.

Conclusions

Basis: 900 slugs. Curies calculated to time of pushing.

(1) Approximately 2800 Curies or 3 Curies/slug of  $I^{131}$  are theoretically available. The total found by analysis was 2100 Curies.

(2) About one third of the total (670 Curies) showed up in the waste from the dissolver scrubber. The volume of this waste is about 58,000 gallons giving an Iodine concentration of only 12 mc/gal.

(3) Two thirds (1400 Curies) remained in the dissolver solution and went through extraction into the metal waste solution without significant diminution. The total volume of metal waste is approximately 1200 gallons giving an Iodine concentration of 1170 mc/gal.

Experimental

Slugs for  $Ba^{140}$  processing are irradiated at least 40 days in the center of the pile and are charged to the 706-D dissolver with less than one day's cooling. They are dissolved in  $HNO_3$  the fumes from the dissolver going through a reflux condenser and a scrubber where residual activity is removed in 4% NaOH.

On Run #10, samples of each dissolver batch were run for  $I^{131}$ . The scrubber waste which goes to tank W-11, was sampled periodically in W-11 and also run for  $I^{131}$ . In the latter case it was necessary to assume that all the volume and iodine found in W-11 came from the dissolver scrubber. This is not strictly true as other lines in 706-D as well as the hot drains in 706-A and C empty into W-11.

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No attempt was made to determine the amount of iodine escaping from the scrubber to the stack as the amount is believed to be small and no good method of sampling was available.

Analytical

I<sup>131</sup> was identified by running decay curves on the samples. All figures are corrected back to 2400, 4/8/46, the approximate average date of discharge.

The calculation of iodine present (2800 Curies) was made by taking 46% of the Ba<sup>140</sup> initially present. This figure obtained from Dr. C. D. Coryell. (unpublished data)

An analytical summary is appended.

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~~SECRET~~I131 IN RUN #10CURIES CORRECTED TO 2400, 4/8/46

Dissolver Batch	I131 in Curies			
	Dissolver Soln.	Metal Waste	Scrubber Waste	Total
A	119		10	129
B	96	88	21	117
C	88		18	106
D	150		25	175
E	132		41	173
F	130	130	35	165
G	97		78	175
H	113		23	136
I	74		45	119
J	50		82	132
K	106		77	183
L	96	85	105	201
M	100		51	151
N	60		63	123
TOTAL	1411		674	2085

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